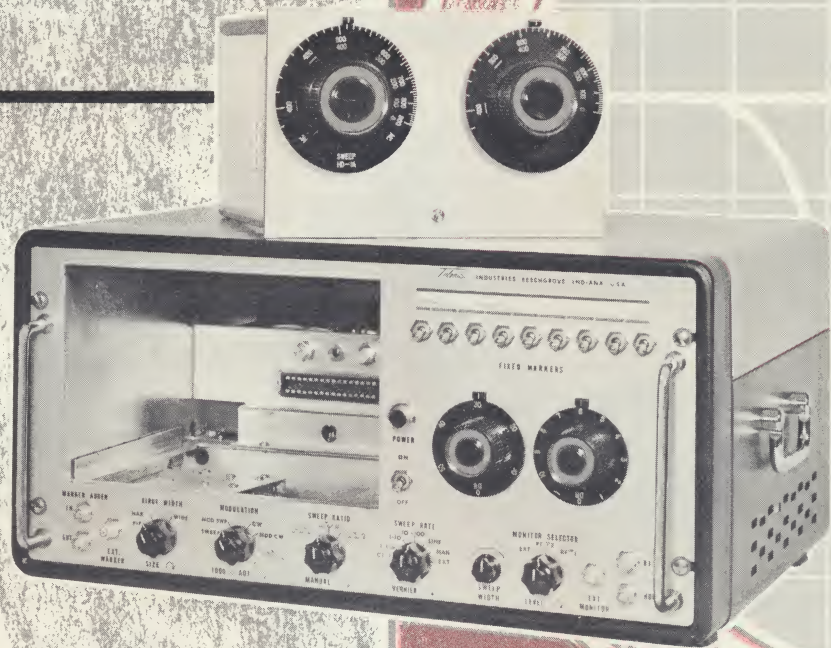


Telonic

SWEEP GENERATORS



- RF ATTENUATORS
- RF DETECTORS
- COAXIAL SWITCHES

Quality Equipment from Audio to 3000 Megacycles

Telonic INDUSTRIES, INC. BEECH GROVE, INDIANA

TELONIC SWEEP GENERATORS

The ultimate check on RF circuit quality is frequency response. Telonic Sweep Generators permit accurate, rapid measurements of frequency response under both laboratory and production line conditions.

A Telonic Sweep Generator scans the entire frequency range in 1/120 of a second, replacing the tedious point-to-point testing normally required. At the same time, the amplitude of the swept signal is precisely controlled to produce a constant voltage input to the circuit under test. Telonic Sweep Generators may be used to perform rapid frequency response tests on filters, mixers, amplifiers and a wide variety of other RF circuits. The circuit output is normally demodulated and presented as a continuous oscilloscope trace.

Built-in precision attenuators allow quantitative measurements of the results.

The RF output of Telonic sweep equipment is held constant by a fast-acting electronic automatic level control circuit. A sample of the signal is detected and applied as a negative feedback voltage to a DC amplifier system. This controls the B+ supply to the sweep oscillator, similar to the electronic regulation in high-quality DC power supplies, this network assures that the signal amplitude is independent of instantaneous frequency.

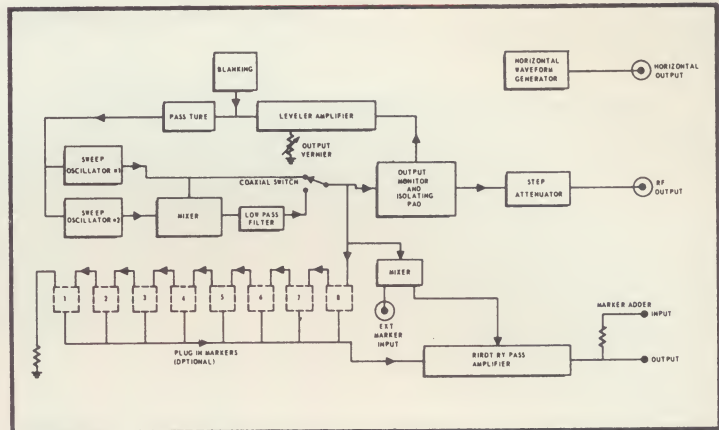
OPERATIONAL DIAGRAM FOR TELONIC SWEEP GENERATOR



All RF compartments are tightly shielded with compressed RF gasketing material, allowing accurate signal attenuation to 100 db or more.

In addition to optional crystal-controlled plug-in markers, provisions are included for introduction of an external CW signal for frequency calibration of the oscilloscope trace. A built-in variable marker is also available on most models. For further discussion of markers, see next page.

MODEL HD-1A



ACCURATE MEASUREMENTS

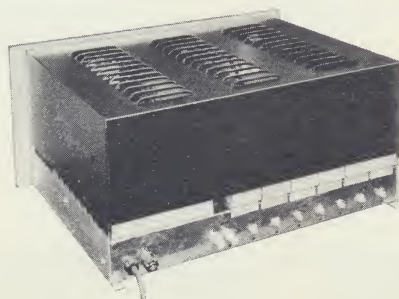
The heart of every Telonic Sweep Generator is a vacuum-tube oscillator. The frequency of this oscillator is swept through the desired range by a modulator consisting of either a saturated ferrite core, a precision vibrating inductor, capacitor, or a solid state varactor. A sawtooth voltage is provided for connection to the horizontal input of the oscilloscope. This wave-form is in phase with the swept signal and provides the "X" axis value of the instantaneous amplitude versus frequency graph appearing on the oscilloscope. The oscillator is cut-off during the return sweep, providing a zero base line on the oscilloscope for quantitative measurements.

In most Telonic Sweep Generators, both the center frequency tuning and sweep width controls are continuously adjustable.

In this manner, any portion of the frequency spectrum of a particular instrument may be displayed in the most convenient manner and the response of the unit under test will always be in the center of the oscilloscope.

Accurate toggle switch or turret attenuators reduce the power input to the circuit under test by precisely known amounts. These attenuators have been especially designed for flat frequency response across the range being measured. Frequency markers are superimposed on the signal trace (see next page) after it has passed through the circuit under test and has been detected, preventing any distortion in the amplitude measurement.

PHYSICAL DESCRIPTION



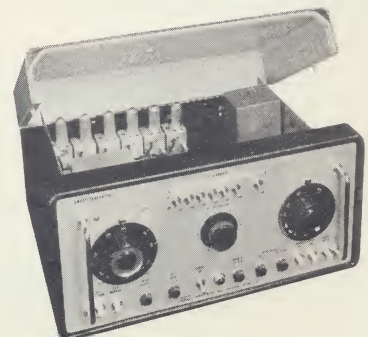
Panel.....1/8" x 8 3/4" x 19"
Chassis.....2" x 14 1/2" x 17"

For rack mounting, bench models are enclosed by dust covers and finished in flat black enamel.

Most bench models are also available in portable cabinets.

Provisions are included for adding up to eight plug-in crystal-controlled markers.

Bench models are enclosed in a hinged top grey and black satin cabinet 10 x 15 x 20.



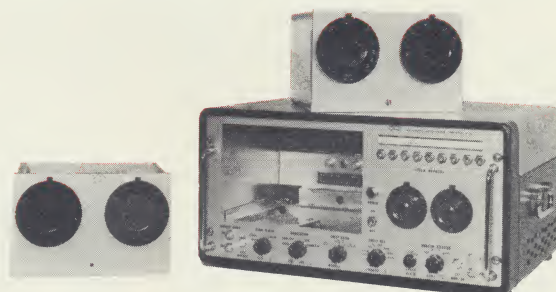
Telonic INDUSTRIES, INC. BEECH GROVE, INDIANA

FROM AUDIO TO 3000 MC

UNIVERSAL SWEEP GENERATOR

The Telonic model SM-2000 is a new dimension in sweep generator design. It is a basic control chassis furnishing power, sweep drive, marker circuitry, automatic level control, attenuation and a variety of other functions to over twenty plug-in RF sweep oscillator units, covering the full 20 cps to 3150 mc frequency range.

The wide variety of plug-ins available make this combination one of the most versatile ever offered in the sweep generator field. Substituting plug-in modules changes the combination into an entirely new instrument—from audio to UHF operation or from wide heterodyne sweeps to customized narrow-band coverage with extremely linear presentations.



TYPICAL PLUG-INS

MODEL SPECIFICATIONS	LA-1M	SH-1	L-4	LH-1	E-2
Freq. Range.....	20 cps-20 kc	0.5-460 mc	10-40 mc	10 kc-12 mc	600-2400 mc
Sweep Width.....	50 cps-20 kc	100 kc-200 mc	0.04-80%	50 kc-12 mc	0.02-10%
Output.....	1 VRMS	1 V peak to peak	1 VRMS	0.5 VRMS	0.5 VRMS
Sweep Rate.....	0.01-100-cps*	50/60 cps	0.01-100 cps*	0.01-100 cps*	50/60 cps
Flatness with Internal Monitor	±0.25 db	±1db	±0.25 db	±0.5 db	±1 db

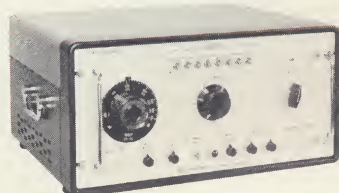
*Continuously variable

GENERAL SPECIFICATIONS

Zero Base Line.....	Oscillator off during return sweep
Sweep Rate.....	E and S heads, 50/60 cps, L heads continuously variable 0.01-100 cps
Scope horizontal output.....	Approximately 15 volts peak to peak
Vernier level control.....	Typically 0-6 db
Power Supply.....	115/230 v, 50/60 cycle, approx. 120 w
Display Linearity.....	Better than 1.2:1
Attenuation.....	0-60 db in 1 db steps
Modes of operation.....	Sweep, CW, 1 kc modulated sweep, 1 kc modulated CW.
Impedance.....	50 ohm

HIGH POWER AND WIDE RANGE SWEEP GENERATORS

HD SERIES (Wide Range)

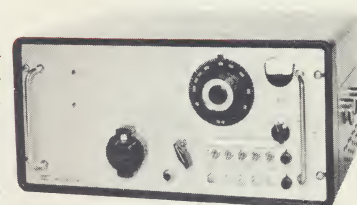


The Telonic HD series sweep generators have wide-band heterodyne outputs derived from a fixed CW oscillator and a swept RF oscillator, or from two oscillators swept 180° out of phase. The HD-1A, HD-3 and HD-7

provide overlapping coverage of the 100 kc to 900 mc range. The HD-1A alone extends from 1-900 mc with continuously adjustable sweep widths to 200 mc. Please see catalog 63-1 for complete specifications.

MODEL SPECIFICATIONS	CENTER FREQUENCY RANGE	SWEEP WIDTH	VOLTAGE OUTPUT	FLATNESS
HD-1A	Lo Band: 1-400 mc Hi Band: 390-900 mc	200 kc-200 mc 0.06-10%	0.75 V P-P 2-V P-P	±0.5 db ±0.5 db
HD-3	1-200 mc	200 kc-200 mc	0.75 V P-P	±0.5 db
HD-7	100 kc-75 mc	100 kc-50 mc	1 V P-P	±0.5 db

PD SERIES (High Power)



The Telonic high power (4 watt) sweep generators introduce a new concept in design. Utilizing a highly stable oscillator, these instruments offer a choice of four modes of operation: Swept RF, Modulated Swept RF, CW and Modulated CW. The modulation signal is a 1 kc square wave and when used with a 1000 cycle-tuned amplifier, this feature extends the range of low level signal recovery.

Employing a high-power UHF triode, these instruments furnish up to 4 watts of swept RF power during the "ON" time of the sweep oscillator.

Units are available with other frequency ranges.

MODEL SPECIFICATIONS	CENTER FREQUENCY	SWEEP WIDTH	RMS OUTPUT VOLTAGE	FLATNESS
PD-2	20-100 mc	0.05-15%	Sweep: 14 V	±7.5%
PD-3	100-250 mc	0.05-15%	Sweep: 14 V	±7.5%
PD-8	375-1000 mc	0.05-15%	Sweep: 14 V	±7.5%

SPECIAL PURPOSE INSTRUMENTS

RADIO and TV—Sweep generators are available specifically designed for production line and laboratory testing of AM-FM radios, TV tuners both VHF and UHF and the overall TV receiver itself. These instruments provide the necessary markers, attenuation and other features needed for complete test and evaluation. Units are available for every TV standard in the world. (Catalog TV-63 describes this equipment.)

RADAR and IF—Various test sets and units which are designed for radar and IF testing are standard production items. These instruments provide Swept, CW and pulse sources for complete testing of this type equipment. (Request catalog 63-1.)

OTHER—Several other sweep generators provide specific band frequency coverage for such special applications as ultrasonic, telemetering, etc. Complete information is available in catalog 63-1.

BIRDY BY-PASS MARKER SYSTEM

In this system, beat or birdy pips are produced by mixing a sample of the sweep oscillator signal with the output of crystal controlled sources. The "birdies" are fed through an amplifier and are added to the demodulated sweep signal before it is connected to the scope vertical amplifier. The markers completely bypass the device under test.

Since the markers are produced directly, no frequency error can occur other than in the marker oscillator itself.

PLUG-IN MARKERS

Up to eight plug-in sockets are included on the chassis of Telonic Sweep Generators, and ON/OFF switches are also mounted on the front panel. This permits mounting of fixed frequency or wide range harmonic markers for accurate frequency identification.

Telonic INDUSTRIES, INC. BEECH GROVE, INDIANA

ATTENUATORS

TURRET ATTENUATORS

Telonic turret attenuators are highly accurate, providing attenuation of RF signals from DC to 900 mc and above.

They consist of resistive elements contained in a precision machined rotor assembly that is designed for optimum match. As the shaft is rotated, the separate attenuator pads connect to the input and output BNC connectors.

Features include extremely low VSWR, low insertion loss and high accuracy across the useful frequency range. Silver plated contacts insure long life even when the unit is in constant, production line use.

TA-50 AND TE-50

The TA-50 is a 0-50 db model with 10 db steps featuring high accuracy and low VSWR to 900 mc.

The TE-50 is an economy priced version of the TA-50. It is identical in design and construction to the TA-50, although the accuracy specifications at the higher frequencies are slightly relaxed. This model is ideal for applications involving frequencies from DC to 30 mc and if attenuation with excellent repeatability is more important than extreme accuracy, this model is suitable for frequencies up to 900 mc.

TB-50

The TB-50 has an 0-10 db range in 1 db steps with the same frequency range as the TA-50.



TAB-50/TEB-50

The Model TAB-50 Turret Attenuator is a dual concentric unit furnishing from 0-59 db in 1 db steps. It incorporates an additive dial arrangement for direct readout, and is designed for operation from DC to 1250 mc. The Attenuator pads consist of resistive elements contained in a precision machined rotor assembly. As the concentric shafts are rotated, the separate attenuator pads connect to the input and output BNC connectors.



The TAB-50 fills the electronic design engineer's need for the universal RF Attenuator. It can be used unmounted as a laboratory unit, or panel mounted as a component in instruments or systems.

Except for slightly relaxed accuracy standards in the 0-50 db section at higher frequencies, the TEB-50 is identical to the highly popular Telonic Model TAB-50.

The new Telonic TAD-50 consists of three separate units—a single-step 0-50 db section, a five-step 0-50 db section, and a ten-step 0-10 db section. This model has the same excellent electrical and mechanical characteristics as the other Telonic turret models, and is attractively packaged in a stainless steel slant-faced cabinet for convenient knob operation.

SPECIFICATIONS

	TB-50	TA-50
Attenuator steps	0-10 in 1 db steps	0-50 in 10 db steps
Impedance	50 ohms	
Frequency Range	DC to 900 mc (useful to 1250 mc)	
Accuracy	$\pm .2$ db to 200 mc $\pm .5$ db at 900 mc	$\pm 2\%$ to 200 mc $\pm 3\%$ $\pm .5$ db at 900 mc
VSWR.	1:1.1 to 300 mc 1:1.3 at 900 mc	
Insertion Loss	negligible to 300 mc .1 db to 500 mc .2 db to 900 mc	
Power Rating	1 watt	

ATTENUATORS (Cont.)

TOGGLE SWITCH

Telonic toggle-switch attenuators provide precisely known attenuation levels over a wide frequency range.

Six standard models, similar to the attenuators used in Telonic equipment, are now being produced. The sturdy low capacity, molded phenolic switches function efficiently even in continuous production line use. Constant impedance resistive pi-pads, thrown in or out of the circuit, attenuate

the input in independent steps. Since any combination may be used every 1 db step in the range can be utilized.



The two basic designs are the 6 and 9 position units. These are available in 50, 70 or 93 ohm characteristic impedance.

The TS series coaxial switches are compact, light-weight units, designed for low VSWR, minimum insertion loss and negligible leakage or crosstalk. The point contact design and positive detent action provide excellent repeatability of electrical characteristics. Silver plated self-cleaning switch contacts assure long trouble free service.

Models available include: double pole, double throw; 4 pole, double throw; and single pole, six position. The two

and four position units are available with ganged three pole, double throw, wafer switch sections so that DC and low frequency circuits can be switched simultaneously with the coaxial RF section. All units include knob and mounting instructions.

